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DETERMINANTS OF CONSUMER ATTITUDES AND WILLINGNESS TO PARTICIPATE IN PLASTIC RECYCLING IN MTHATHA

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ABSTRACT

This study examined the determinants of consumers' attitudes and willingness to participate in plastic recycling activities in Mthatha. Drawing on the Theory of Planned Behaviour (TPB), it integrated recycling infrastructure and economic incentives to extend behavioural understanding in developing economies. A positivist, quantitative research design was employed. Data were collected via a structured questionnaire from 370 residents and informal recyclers, selected through simple random sampling. Structural Equation Modelling (SEM) using SmartPLS 4 tested the hypothesised relationships among constructs. Reliability and validity were verified through Cronbach's alpha, composite reliability, and average variance extracted. All five hypotheses were supported with each having a significant positive effect on Attitude towards Plastic Recycling. Attitude strongly influenced Willingness to participate, confirming its mediating role. The model explained 71.8 per cent of the variance in willingness. Enhancing environmental education, improving recycling infrastructure, and introducing financial incentives can increase participation in plastic recycling. Local governments should design integrated awareness and infrastructure programmes that mobilise community engagement. This research extends TPB by empirically validating the combined influence of psychological, social, and infrastructural factors in a small-town developing-country context contributing both theoretical and policy insights into pro-environmental consumer behaviour in Africa.

KEYWORDS: Plastic Recycling, Consumer Attitude, Willingness to Participate, Environmental Knowledge, Subjective Norms, Economic Incentives, Recycling Infrastructure, Theory of Planned Behaviour, South Africa.

1. INTRODUCTION

Plastic pollution has become one of the most pervasive environmental challenges globally, posing critical threats to ecosystems, human health, and sustainable development (United Nations Environment Programme [UNEP], 2023). Recycling is recognised as a pivotal strategy in mitigating plastic waste and advancing the circular economy, which underpins the United Nations Sustainable Development Goals (SDGs 11, 12 and 13). Despite rising global awareness, many developing regions continue to experience low recycling participation due to infrastructural deficits, limited public awareness, and socio-economic constraints (Parker *et al.*, 2020). In South Africa, plastic recycling remains unevenly implemented. Urban centres have made moderate progress, yet smaller towns such as Mthatha in the Eastern Cape face persistent barriers including inadequate collection systems, informal waste management practices, and minimal civic engagement (Department of Environmental Affairs [DEA], 2022). Understanding the behavioural determinants of consumer participation is thus essential for designing effective, inclusive recycling policies. Existing literature on environmental behaviour especially studies guided by the Theory of Planned Behaviour (TPB) (Ajzen, 1991) emphasises the role of attitudes, subjective norms, and perceived behavioural control in predicting pro-environmental intentions. However, the TPB framework has been tested in developed economies, where structural conditions differ markedly from resource-constrained African contexts (Bamberg & Möser, 2020). In these settings, contextual variables such as infrastructure quality and economic incentives may significantly shape attitudes and willingness to act (Mazzanti & Tavoni, 2019).

This study therefore aims to identify the determinants of consumers' attitudes and their willingness to participate in plastic recycling in Mthatha. It extends the TPB by incorporating Recycling Infrastructure and Economic Incentives as context-specific antecedents, alongside Environmental Knowledge and Subjective Norms. Through this model, the paper examines both cognitive and contextual influences on recycling behaviour.

Empirically, the study contributes to sustainable-consumption literature by providing rare evidence from a South African small-town environment, where informal recycling networks coexist with municipal challenges. Theoretically, it enriches the TPB by demonstrating the mediating role of attitude within a multi-factor model adapted for developing-

country conditions. Practically, the research offers policy recommendations for enhancing participation through education, infrastructure, and incentive-driven strategies. The remainder of this paper is organised as follows. Section 2 reviews the literature and develops hypotheses. Section 3 outlines the research methodology. Section 4 presents empirical results. Section 5 discusses the findings and implications, and Section 6 concludes with recommendations for policy and future research.

2. LITERATURE REVIEW

2.1. Theoretical Foundation

2.1.1. Theory Of Planned Behaviour

The Theory of Planned Behaviour (TPB) (Ajzen, 1991) explains how attitudes, subjective norms, and perceived behavioural control predict behavioural intentions. Attitude reflects an individual's positive or negative evaluation of performing a behaviour; subjective norms capture perceived social pressures; and perceived behavioural control denotes the ease or difficulty of acting. Within environmental studies, TPB has been extensively applied to explain recycling, energy conservation, and green purchasing (Chen & Tung, 2018). However, the theory's explanatory capacity can be strengthened by integrating contextual determinants relevant to developing societies specifically infrastructure availability and economic incentives that influence behavioural intention beyond individual cognition (Geng *et al.*, 2019).

2.2. Empirical Review and Hypothesis Development

2.2.1. Environmental Knowledge

Environmental knowledge denotes awareness and understanding of ecological issues and the consequences of human actions (Afsar *et al.*, 2020). Higher levels of knowledge are consistently associated with stronger pro-environmental attitudes and recycling participation (Awan *et al.*, 2021). In contexts like Mthatha, limited access to environmental education constrains informed decision-making. Hence, greater environmental knowledge should foster more positive attitudes toward plastic recycling.

H₁: Environmental knowledge has a positive effect on attitude towards plastic recycling in Mthatha, South Africa.

2.2.2. Subjective Norms

Subjective norms represent the influence of social

networks, family, and community expectations on individual behaviour (Ajzen, 2020). When people perceive recycling as a valued social practice, they are more likely to develop favourable attitudes (Kahn et al., 2022). In collectivist cultures common across African communities, social endorsement can powerfully motivate behavioural alignment.

H²: Subjective norms positively influence attitude towards plastic recycling in Mthatha, South Africa.

2.2.3. Recycling Infrastructure

Recycling infrastructure collection points, bins, sorting facilities, and municipal services acts as both an enabler and symbol of institutional commitment (Tanskanen et al., 2021). Adequate infrastructure reduces effort and increases convenience, enhancing attitudes toward recycling (Afroz et al., 2020). Conversely, weak infrastructure undermines public motivation.

H³: Recycling infrastructure has a positive effect on attitude towards plastic recycling in Mthatha, South Africa.

2.2.4. Economic Incentives

Economic incentives include financial rewards, discounts, or rebates offered to encourage recycling (Agovino et al., 2020). Incentive programmes can

tangible value, particularly in low-income settings. Nonetheless, their impact is strongest when paired with awareness and social support (D’Amato et al., 2021).

H⁴: Economic incentives positively influence attitude towards plastic recycling in Mthatha, South Africa.

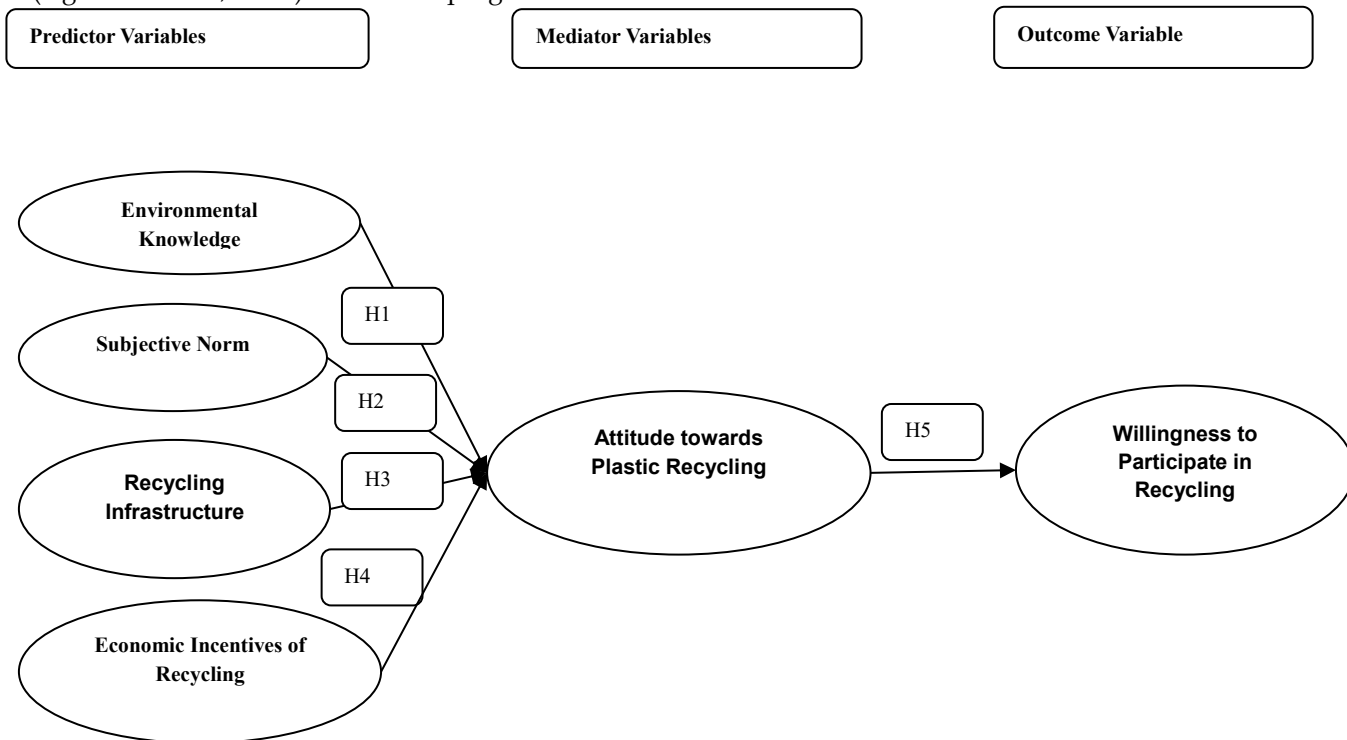
2.2.5. Attitude And Willingness to Participate

Attitude is a central determinant of behavioural intention under TPB (Ajzen, 1991). A favourable evaluation of recycling leads to a stronger willingness to participate (Nguyen et al., 2021). In developing contexts, positive attitudes may mediate the effect of knowledge, norms, and contextual factors on behavioural willingness.

H⁵: Attitude towards plastic recycling positively influences willingness to participate in recycling activities in Mthatha, South Africa.

3. CONCEPTUAL MODEL

The conceptual model (Figure 1) posits that environmental knowledge, subjective norms, recycling infrastructure, and economic incentives serve as antecedents to attitude, which in turn determines willingness to participate. Attitude functions as a mediating mechanism linking external and internal influences on behavioural intention.



complement intrinsic motivations by demonstrating

Figure 1: Conceptual Model.

4. RESEARCH METHODOLOGY AND DESIGN

This study adopted a positivist research philosophy and a quantitative research design to

empirically examine the determinants of consumers' attitudes and their willingness to participate in plastic recycling activities. The positivist paradigm assumes that social phenomena can be objectively measured through observable relationships, making it well suited for the use of statistical tools such as Structural Equation Modelling (SEM) (Creswell, 2019). A descriptive, cross-sectional survey strategy was used to collect data from participants in Mthatha, South Africa.

The target population consisted of residents and informal recyclers involved or potentially involved in plastic recycling within Mthatha. Due to the absence of an official database of recyclers, a simple random sampling method under a probability framework was applied to ensure representativeness. Based on a population estimate of approximately 10,000 residents engaged in recycling or waste-related activities, a sample size of 370 respondents was determined using the Rao soft sample size calculator at a 95% confidence level and a 5% margin of error.

Of the distributed questionnaires, 364 valid responses were obtained (response rate = 98.4%), which is adequate for SEM analysis (Hair *et al.*, 2021).

Data were collected through a self-administered structured questionnaire divided into sections corresponding to study variables: Environmental Knowledge, Subjective Norms, Recycling Infrastructure, Economic Incentives, Attitude towards Plastic Recycling, and Willingness to Participate. All constructs were measured using a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

Items were adapted from validated instruments in prior recycling and environmental behaviour studies (e.g., Ajzen, 1991; Afroz *et al.*, 2020; Geng *et al.*, 2019). A pilot test with 25 participants confirmed clarity and reliability.

Ethical clearance was obtained from Walter Sisulu University's Ethics Committee (Protocol number: 21/2025/MBM/BME/5309). Participation was voluntary, confidential, and anonymous.

5. DATA ANALYSIS AND RESULTS

Data analysis followed a two-step SEM approach using SmartPLS 4:

1. Measurement model assessment for reliability and validity.
2. Structural model assessment for hypothesis testing and model fit.

Reliability was assessed via Cronbach's alpha (α) and Composite Reliability (CR), both exceeding the 0.70 threshold. Validity was confirmed through the Average Variance Extracted ($AVE > 0.50$) and discriminant validity using the Fornell-Larcker criterion.

5.1. Measurement Model

All constructs demonstrated acceptable internal consistency (Cronbach's α ranged from 0.81 to 0.93). Composite Reliability (CR) values ranged between 0.87 and 0.95, exceeding the 0.70 standard. The Average Variance Extracted (AVE) for all constructs exceeded 0.50, indicating adequate convergent validity. Discriminant validity was established since the square root of AVE for each construct was greater than its inter-construct correlations.

5.2. Structural Model and Hypothesis Testing

Model fit indices showed satisfactory values:

- SRMR = 0.061,
- R^2 (Attitude) = 0.657,
- R^2 (Willingness to Participate) = 0.718,
- Q^2 = 0.437 (predictive relevance confirmed).

All five hypotheses were supported, as shown in Table 1.

Table 1: Hypothesis Testing Results (Pls-Sem Output).

| Hypothesis | Path | β | t-value | P-value | Outcome |
|------------|---|---------|---------|---------|-----------|
| H1 | Environmental Knowledge \rightarrow Attitude towards Plastic Recycling | 0.194 | 2.296 | 0.022 | Supported |
| H2 | Subjective Norms \rightarrow Attitude towards Plastic Recycling | 0.257 | 5.351 | 0.000 | Supported |
| H3 | Recycling Infrastructure \rightarrow Attitude towards Plastic Recycling | 0.342 | 4.216 | 0.000 | Supported |
| H4 | Economic Incentives \rightarrow Attitude towards Plastic Recycling | 0.155 | 2.427 | 0.015 | Supported |
| H5 | Attitude towards Plastic Recycling \rightarrow Willingness to Participate | 0.718 | 15.228 | 0.000 | Supported |

5.3. Interpretation Of Findings

Environmental knowledge ($\beta = 0.194$) and subjective norms ($\beta = 0.257$) significantly predicted positive attitudes, aligning with TPB assumptions that cognitive awareness and social influence shape behavioural intention. Recycling infrastructure ($\beta =$

0.342) emerged as the strongest contextual determinant of attitude, while economic incentives ($\beta = 0.155$) showed a moderate but significant effect. Attitude itself had the strongest influence on willingness ($\beta = 0.718$, $t = 15.228$, $p < 0.001$), confirming its mediating role between determinants and behavioural intention.

6. DISCUSSION OF RESULTS AND IMPLICATIONS

6.1. Summary Of Findings

This study investigated determinants of consumers' attitudes and willingness to participate in plastic recycling in Mthatha, using an extended TPB framework. Results indicate that environmental knowledge, subjective norms, recycling infrastructure, and economic incentives significantly enhance positive attitudes toward recycling, which in turn strongly predict willingness to participate. Attitude serves as a crucial mediator linking individual cognition and contextual conditions to behavioural intention.

6.2. Theoretical Implications

The findings reinforce the Theory of Planned Behaviour (TPB) as a robust explanatory framework for pro-environmental action in developing contexts. By incorporating recycling infrastructure and economic incentives, this study extends TPB to include contextual determinants relevant to low-resource environments. The model accounted for 65.7% of the variance in attitude and 71.8% in willingness, demonstrating strong predictive power compared to similar recycling studies (e.g., Aman et al., 2019; Nguyen et al., 2021).

Environmental knowledge's positive effect confirms that informed citizens are more likely to develop pro-recycling attitudes (Afsar et al., 2020). Subjective norms' influence aligns with collectivist tendencies observed in African societies, where community expectations guide behaviour (Chen & Tung, 2018). The significant role of infrastructure validates research suggesting that convenience and accessibility are vital to converting intention into action (Mazzanti & Tavoni, 2019). These findings suggest that recycling in Mthatha is not merely a technical waste-management issue but a cultural shift where subjective norms and community identity play a primary role in environmental stewardship.

6.3. Practical Implications

The study underscores the necessity for integrated policy approaches combining education, social mobilisation, infrastructure provision, and economic motivation.

- Local municipalities should improve recycling infrastructure such as well-maintained collection centres and household bins to reduce effort and increase participation.
- Government and private sector collaboration

could introduce deposit-refund or reward schemes, aligning with findings that incentives enhance motivation (Agovino et al., 2020).

- Educational institutions and NGOs should embed environmental literacy programs in schools and community campaigns to build long-term attitudes.
- Community leaders and influencers can play a pivotal role in reinforcing subjective norms that normalise recycling as a civic responsibility.

The results correspond with global literature confirming the mediating role of attitude in recycling behaviour (Oskamp et al., 2020). However, the present study contributes novel insights from a semi-urban African town context underrepresented in behavioural research. While studies in Asia and Europe often highlight convenience and incentives, this research reveals that infrastructure deficits are a major attitudinal barrier in smaller African municipalities.

7. RECOMMENDATIONS

- Local Governments: Invest in accessible recycling infrastructure strategically located drop-off centres and reliable waste collection schedules.
- Environmental Agencies: Develop awareness campaigns that communicate the economic and ecological value of recycling.
- Policy Makers: Implement fiscal incentives such as tax rebates or deposit-return systems to reward household participation.
- Private Sector: Partner with municipalities in public-private recycling ventures to sustain infrastructure and incentive mechanisms.

Encouraging sustainable recycling behaviour in developing communities demands an integrative approach that strengthens knowledge, infrastructure, and social norms. By addressing both psychological and structural factors, policymakers can foster a recycling culture essential for achieving circular economy goals in Africa.

8. CONTRIBUTIONS OF THE STUDY

The research contributes to behavioural and sustainability literature by contextualising TPB in a developing-country setting and demonstrating the explanatory significance of infrastructural and economic variables. The integration of these constructs enhances TPB's capacity to model pro-environmental intentions within socio-economically constrained environments. By examining the interplay between communal norms and plastic

waste management in Mthatha, this study provides a cultural lens through which scientific environmental interventions can be successfully localised in Global South.

9. LIMITATIONS AND FUTURE RESEARCH

The study is limited by its cross-sectional design and focus on a single geographic location (Mthatha),

restricting causal inference and generalisability. Future research could employ longitudinal designs to observe behavioural change over time and extend the model to include perceived behavioural control or trust in local governance as moderating variables. Comparative studies across South African regions or Sub-Saharan countries are encouraged to validate these findings globally.

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